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Natural Theology and the Qur'an

Robert G. Morrison

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Natural theology is reading the book of nature, not the book of revelation, for knowledge of God.[1] Natural theology, as a category employed by practitioners, originated within the history of Christianity, as passages from the New Testament such as Romans 1:20 raised the possibility of knowledge about God without revelation.[2] The best-known work of natural theology is William Paley's (d. 1805 AD) *Natural Theology: or, Evidences of the existence and attributes of the Deity, collected from the appearances of nature*.[3] Previous to this, Thomas Aquinas (d. 1275 AD) had made arguments that were in the spirit of natural theology and Robert Boyle (d. 1691 AD) was interested in the subject.[4] The Qur'an, likewise, refers to the wonders of nature in the course of its arguments for God's existence and power.[5] The Qur'an's discussion of humans' *fiṭra* and *ḥunafāʾ* (s. *ḥanīf*),[6] along with its evocation of the wonders of creation as evidence of God's existence and power, meant that at least some of the Qur'an's themes might be apprehended without revelation and that it is worth exploring the theme of natural theology in Islamic thought.[7] But the general importance of revealed law in Islam and the specific doctrine of *naskh* are a reminder that the particulars of a revealed text matter. The fact that nature contains some things that are *ḥarām*[8] suggests that the book of nature would not be on a par with *al-sharʿ* ('revelation').

This article will explore how, in premodern Islam, there were arguments that could be identified as being in the vein or spirit of natural theology even if practitioners did not use the term at the time. Still, there was a distinction between what nature could communicate about God, e.g. God's wisdom, power and solicitude (*ʿināya*), and what nature could communicate of religious obligations. Or, nature might communicate a few general religious obligations, but certainly not all in detail.[9] The subject of this article, Nāṣir al-Dīn al-Bayḍāwī (d. 716/1316), himself placed limits on what one could learn about God without the aid of revelation.[10] (Al-Bayḍāwī's date of death

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has been given as 685/1286 or 692/1293,[11] but recent scholarship argues for 715–6/1316.[12]) More recently, Tariq Ramadan has spoken of the universe being a revealed book like the Qur'an.[13] As was the case in Christendom, arguments in the vein of natural theology developed in an intellectual context in which a burgeoning scientific enterprise had become part of a tradition of religious scholarship.[14] Some of these scientific texts from Islamic societies noted how an understanding of God's creation could enhance one's appreciation of God's role in creation and perhaps one's understanding of how God operates.[15]

To an extent, such arguments were also a component of *kalām* texts, particularly as *kalām* became more ontologically and less theologically oriented. Influential secondary literature on science and *falsafa* in *kalām*[16] has presumed the centrality of the *Mawāqif fī ʿilm al-kalām* (composed *c.* 730/1330) of ʿAḍud al-Dīn al-Ījī (d. 756/1355), as an example of a *kalām* text that was oriented more to classifying existence (what is matter?) than to classically theological questions (is God just?), and which, therefore, appropriated concepts from science and *falsafa* with remarkable facility.[17] Al-Ījī did argue that details of nature could tell one something about God, though only about God's providence and solicitude.[18] While Sabra argued that al-Ījī saw scientific theories simply as explanatory devices that could neither be verified or denied,[19] a forthcoming article of mine argues that, actually, al-Ījī sometimes argued that scientific explanations were probably not correct.[20] And if the scientific explanations were probably not correct, then al-Ījī could have proposed better alternatives, but he did not. In order to argue most forcefully that celestial matter and phenomena were due only to God, it turns out that al-Ījī chose to argue as much as possible against any human attempt to explain the heavens, a line of argumentation that compromised nature's legibility or intelligibility. For example, al-Ījī questioned the astronomers' principle that the celestial orbs moved with uniform circular motion.[21] Many of al-Ījī's statements that were critical of astronomy also made tendentiously incorrect statements about astronomy that had the effect of decreasing astronomy's intellectual prestige, suggesting that science texts were not simply a source for *mutakallimūn*, but that *mutakallimūn* were also in a debate with scholars of science over how nature could best serve rational speculation about God. Arguments in the vein of natural theology served some of *kalām*'s ends, but not all of them. The question of whether natural theological knowledge was certain was, from the perspective of *kalām*, most complex, as it cut between, on one hand, *kalām*'s claim that Islam did not need to be accepted uncritically, and, on the other hand, *kalām*'s need to undercut and underplay some findings of science (for example, that intermediate causes, though their existence could not be demonstrated conclusively, played an important role in explanations).

Recent research has already located and studied some scholars who rebutted *mutakallimūn*'s arguments that were critical of science.[22] Their reactions took issue with al-Ījī's position, be it instrumentalist or critical of scientific epistemology; these

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scholars did not understand al-Ījī to be offering them any sort of compromise.[23] They implied that there was no purpose to evocations of the natural world in *kalām* texts if there was no positive agenda for the accurate, rationalist study of nature. The present article attempts to expand our knowledge of this discussion of natural theology and how a different perspective on the value of arguments in the vein of natural theology existed in works of *tafsīr*. General works on natural theology, when they do turn to Islam, tend to confine themselves to *kalām*, and then only to certain *mutakallimūn*.[24]

This paper focuses on the work of Naṣīr al-Dīn al-Bayḍāwī, and compares and contrasts comments that he made about the natural world in his *kalām* text and his *tafsīr*.[25] Al-Bayḍāwī is a worthwhile figure to study for three reasons. First, his *kalām* text, *Ṭawāliᶜ al-anwār*, was a model for al-Ījī's *Mawāqif* both in form and content, including the implicit criticisms of scientific epistemology.[26] This attention to the prehistory of al-Ījī's *Mawāqif* is valuable also because we see how the *Mawāqif* was just a data point (albeit an important one) in the history of a debate about the significance and role of a scientific study of nature for learning about God.

Excellent evidence for how *Ṭawāliᶜ al-anwār* reflects an earlier stage in the incorporation of science into *kalām* lies in later scholars' response to *Ṭawāliᶜ al-anwār*'s examination of the source of the planets' luminosity. The evidence itself lies in texts that followed some statements by al-Bayḍāwī. Given that the moon's phases suggested that the moon, if it was luminescent, might not be equally luminescent, al-Bayḍāwī used the evidence of lunar eclipses to argue that one could not argue that the moon was half illuminated and half darkened, itself rotating in its orb.[27] Had that been the case, there would have been no way to explain the sudden darkening of the moon during a lunar eclipse. Al-Bayḍāwī's point mirrored astronomers' intuition, made on the basis of observations, that the sun illuminated the moon and that the path of the moon was inclined to the sun's by five degrees.[28] Then, al-Bayḍāwī's commentator Maḥmūd al-Iṣfāhānī (d. 749/1348), whose other comments suggested a sympathy to astronomy, argued that if it was true that an eclipse occurred at the opposition of the sun and the moon, then the lack of an eclipse at every opposition might indicate that the moon's light does not come from the sun.[29] Al-Iṣfahānī's comments on this point indicated that he did not understand that the moon's path was inclined to the sun's path by five degrees, the reason why not every opposition of the moon and sun would lead to an eclipse. Subsequently, al-Ījī went on to make the argument that a body other than the sun, moon and earth played a role in eclipses,[30] meaning that al-Ījī rejected the explanation for eclipses that al-Bayḍāwī (and al-Ghazālī (d. 505/1111)) had accepted from the astronomers. The fact that al-Iṣfahānī's account of astronomy was erroneous and al-Ījī's was heavily sceptical indicates that *Ṭawāliᶜ al-anwār* was written at an early stage of *kalām*'s shift to a more ontological approach, a shift traced thoroughly by Heidrun Eichner.[31]

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The second reason why al-Bayḍāwī is interesting is that both al-Bayḍāwī and al-Ījī were associated with the Ilkhānid court at Tabrīz, a court that also patronised Quṭb al-Dīn al-Shīrāzī (d. 710/1311) and Niẓām al-Dīn al-Nīsābūrī (d. *c.* 731/1330), two polymaths who were quite confident in scientific epistemology and related science to their work in, say, *fiqh* and *tafsīr*.[32] Thus al-Bayḍāwī's intellectual milieu included the most proficient astronomers of the era. Just as one should not overlook the commentaries on the *Mawāqif* (e.g. al-Jurjānī's (d. 816/1413) as well as Mīr Zāhid al-Harawī's (d. 1100–1/1689) gloss)[33] and their relative sympathy to astronomy's conclusions, further examination shall show how al-Bayḍāwī's writings reflect a nuanced position at the Ilkhānid court about whether nature could communicate religious truths. In fact, both al-Bayḍāwī and his commentator al-Iṣfahānī, as Ashᶜarī *mutakallimūn*, were nevertheless influenced by Ibn Sīnā's (d. 428/1037) distinction between essence and existence.[34] The *mutakallimūn*'s position on science and *falsafa* was not completely univocal. The third reason for interest in al-Bayḍāwī was that an important dimension of these discussions existed in *tafsīr*. Al-Bayḍāwī wrote two texts that dealt with natural theology; each took a different side in the debate.[35]

We shall begin with al-Bayḍāwī's treatise on *kalām*, *Ṭawāliᶜ al-anwār min maṭāliᶜ al-anẓār*, and its reception via al-Iṣfahānī's[36] commentary (*Maṭāliᶜ al-anẓār*)[37] before moving to the *tafsīr* (*Anwār al-tanzīl*).[38] From the purview of *kalām*, the celestial bodies were relevant inasmuch as they were a category of existent. These bodies were ostensibly composed of indivisible atoms (*ajzāʾ*).[39] The third book (*bāb*) of *Ṭawāliᶜ al-anwār* is about bodies (*ajsām*) and their divisions (*aqsām*).[40] In addition to compound bodies, there were simple bodies that were spherical and divided into elemental (*ᶜunṣuriyyāt*) and celestial (*falakiyyāt*), the latter being the orbs and the planets (the premise for studying astronomy within *kalām*).[41] Astronomers often spoke of a single orb for each planet, which was shorthand for the complex of orbs that accounted for all of a planet's motions. Thus, it was commonplace to speak of a cosmos of nine orbs, with seven orbs for the five planets and two luminaries, one (the eighth) for the motion of the fixed stars in precession, and one (the ninth) to account for the cosmos' diurnal motion.

Al-Bayḍāwī questioned some of the astronomers' conclusions about the ninth orb. He remarked that observations of the cosmos' diurnal motion furnished evidence for a ninth orb, but not for the astronomers' conclusion that the ninth orb encompassed all of the bodies.[42] The issue here is less whether the ninth orb encompassed all other bodies including, implicitly, the other eight orbs, but if observations alone could be a sufficient basis for a demonstration of whether the ninth orb necessarily encompassed everything. It is not clear, though, how the ninth orb would move the other eight orbs with the daily motion if it did not encompass them. And if the ninth orb did not encompass all other celestial bodies, were there some bodies outside of the ninth orb? But, then, why not place those bodies in an orb responsible for the daily motion?

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Actually, although observations alone would not be sufficient evidence for a ninth orb,[43] once one posits a ninth orb responsible for the daily motion, observations would *necessitate* that this ninth orb encompasses all others because all celestial bodies move with the daily motion. Al-Iṣfahānī, unfortunately, had no comment.

Al-Bayḍāwī's discussion of the orbs included other criticisms of the astronomers' presuppositions and conclusions that did spark a debate. For instance, al-Bayḍāwī wrote: 'One might say (*li-qā'il an yaqūl*) if the impossibility of piercing [the orbs] is established, why is it not conceivable (*limā lā yajūz*) that each planet has a belt (*niṭāq*) that moves on its own or through the impulsion (*i'timād*) of the planets upon it?'[44] Al-Bayḍāwī's point, one with a history and a future, was that a system of rings, rather than orbs, each of which might be moved by something other than a soul, could just as easily account for the observations.[45] Al-Iṣfahānī contested al-Bayḍāwī, saying that if one were to look at astronomy and to consider the principles (*uṣūl*) upon which the discipline was constructed, then this objection would fall away.[46] Al-Iṣfahānī was probably saying that the impulsion (*i'timād*) of the planet on the ring would account for the motion of the ring that took the place of the epicycle that held the planet, but not the motion of the other rings (or orbs) that made up the complex of rings (or orbs) for a given planet. Those orbs, therefore, could not be moved through the impulsion of the planet upon them because a single mover could not cause two different motions. The tenor of al-Iṣfahānī's comments reflected the position that astronomy was more valuable when studied on its own terms. Al-Jurjānī, in his gloss (*ḥāshiya*) on al-Iṣfahānī's commentary, noted that the *mutakallimūn* who criticised astronomy, al-Bayḍāwī being among them, did not produce evidence for their claims (e.g. the existence of a void).[47] Not only were arguments in the vein of natural theology less feasible the more difficult even a probable knowledge of the heavens' structure was, but furnishing evidence (*istidlāl*) from the natural world itself was key to the enterprise.

Finally, the questions of how the behaviour of the celestial bodies could be attributed to their composition and how much that behaviour depended directly on God's will had implications for what a study of nature could communicate. In *Ṭawāli' al-anwār*, al-Bayḍāwī discussed, in the context of determining whether the heavens inherently moved with uniform circular motion, if the heavens' form could ever be separated (*infakka*) from the primal matter (*al-hayūlā*). While the *falāsifa* held that such a separation was impossible (*qālū inna al-ṣūra lā tanfakk 'an al-hayūlā*), and that bodies (even elemental bodies) were combinations of a form with primal matter, al-Bayḍāwī rejected these arguments, understanding them to be based on the denial of a free-willed creator (*al-fā'il al-mukhtār*).[48] That said, al-Bayḍāwī conceded that one might argue that the reason for the variations in the accidents and structures (*hay'āt*) of the celestial bodies was variations in the celestial material (*wa-ikhtilāf al-mawādd al-falakiyya sabab li-ikhtilāf al-a'rāḍ wa'l-hay'āt*),[49] and not the accidents that God

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imparted to that material. This suggests al-Bayḍāwī's willingness to consider something other than the *mutakallimūn*'s position that the orbs were made up of uniform atoms that differed only in the accidents that God imparted.

Al-Iṣfahānī's own position illustrates that there were scholars whose systems did not depend on the uniformity of celestial matter. He wrote: 'As for specifying the celestial bodies through their specific (*nawᶜiyya*) forms, it might be argued that it is because every celestial sphere would have matter differing in quiddity from the matter of another … As for celestial bodies, every one of them would be specified by a particular quality because its matter receives only that quality.'[50] Thus, the immediate question was whether the differences were due to a form inherently connected to the substance or whether the matter of one orb could differ from the matter of another.

But, as al-Bayḍāwī pointed out, via the example of the terrestrial elements, uniform matter could exist without necessarily moving in circular motion.[51] As al-Iṣfahānī showed, the only way to distinguish celestial matter from elemental matter would be to say that one had the principle of uniform motion in it, and the other did not. The conclusion was that the presence of this principle (*athr*) entailed the existence of the *muᵓaththir*, the one who gave the principle. It is interesting that al-Bayḍāwī, in order to contend that the matter of the celestial orbs did not necessitate uniform circular motion portrayed the heavens differently than al-Ījī. Were one to propose unequal motions in the heavens, as al-Ījī did, the lack of certainty about the nature of the effect would lead to an inability to reason from the effect to the cause, the central preoccupation of arguments in the vein of natural theology. One would have to go directly to the only possible conclusion: that the motions were somehow due to God, though the study of nature would no longer be necessary to arrive at that conclusion. The more the *mutakallimūn* undercut astronomy and other human attempts to understand nature, the less powerful arguments in the vein of natural theology would be.[52] This brief survey of al-Bayḍāwī's presentation of astronomy in his *kalām* text, with an eye to al-Ījī's later *Mawāqif*, suggests that the *mutakallimūn*'s position on the reliability of the astronomers' conclusions developed through a debate with those making arguments in the vein of natural theology. We will see that, in al-Bayḍāwī's *tafsīr*, *Anwār al-tanzīl*, arguments in the vein of natural theology received a great deal more attention and credence.

Not only was *tafsīr* a different genre, but, as Walid Saleh has argued tirelessly, *tafsīr* was *the* central Islamic discipline.[53] Al-Bayḍāwī wrote his *tafsīr* near the end of his life[54] in Tabrīz, stating in that text that *tafsīr* was the most important of the religious sciences (*al-ᶜulūm al-dīniyya*).[55] While al-Bayḍāwī's *tafsīr* is not widely known for its incorporation of scientific content, it deserves examination due to al-Bayḍāwī's importance as an Ashᶜarī *mutakallim*. Al-Bayḍāwī, in the introduction to his *tafsīr*, did not mention that he would draw on material from the natural sciences, but he did say

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that those suited to understanding *tafsīr* had to be familiar with material *outside* the religious sciences.[56] Nevertheless, al-Bayḍāwī's discussions of science were brief but well worth examining. I want to look at al-Bayḍāwī's comments on verses discussing the natural world in order to see the extent to which, in a different genre, al-Bayḍāwī saw science's depiction of nature as a means to learning about God.

The distinction between al-Bayḍāwī's activity in each genre was not absolute as there is at least one instance where al-Bayḍāwī's comments on a verse regarding the natural world reflected a caution about astronomy's conclusions similar to that found in his *Ṭawāliᶜ al-anwār*. In his comments on Q. 2:29, *It is He who created for you all that is in the earth, then He lifted Himself to heaven and levelled them seven heavens; and He has knowledge of everything*, regarding the reference to seven heavens, al-Bayḍāwī claimed that there was a limit to what astronomy could actually tell you. He noted that astronomers disagreed about the number of orbs, questioning whether the orbs of the astronomers corresponded with the seven heavens mentioned in the verse. Al-Bayḍāwī wrote that 'if it were said that the masters of observation (*aṣḥāb al-arṣād*) allege that there are nine orbs, I say: there are doubts about what they have mentioned. And if it [what they have mentioned] is correct, then there is nothing in the verse that prevents an increase, for if *al-ᶜarsh* and *al-kursī* are included with it [i.e. the seven heavens], then there remains no difference.'[57] This was a fascinating comment because it appeared to reflect the debate among astronomers, including al-Bayḍāwī's contemporary al-Shīrāzī, over whether there were seven, eight or nine orbs in the heavens.[58] A seven, eight and nine-orb cosmos each accounted for observations equally well. This debate was an excellent example of how closely a *mutakallim* and *mufassir*, al-Bayḍāwī, followed scientific debates with an acute sense of what was at stake and deployed these debates for an argument that followed the perspective on astronomy found in *kalām* texts. That is, astronomy could not approach the epistemological certainty of *kalām* if the astronomers themselves disagreed about something so fundamental as how many orbs there were. And if astronomers could not be sure about how many orbs there were, then there was no point in trying to learn about God through nature. Rather, the more reliable path would be to invoke God's omnipotence as a solution. In addition, al-Bayḍāwī's inclusion of this debate about astronomy, which occurred in the seventh/thirteenth century, and others complicates the regnant impression that al-Bayḍāwī's *tafsīr* was simply an Ashᶜarised version of al-Zamakhsharī's (d. 538/1144) *tafsīr*.[59]

Elsewhere, though, when al-Bayḍāwī accepted the occasionalist principle of *ᶜāda* ('habit'), he did not do so to diminish what one could learn about God through nature but to show that God created a habitual natural order. Al-Bayḍāwī's comments on Q. 41:53, *We shall show them Our signs in the horizons and in themselves, till it is clear to them that it is the truth*, show how some perception of habitual occurrence (*al-ᶜāda*) was important for grasping the Qur'an's reports of miracles.[60]

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Not surprisingly, al-Bayḍāwī understood outstanding events of the past as disruptions of custom (*ʿalā wajh khāriq al-ʿāda*) so as to argue that there was no other way to understand events such as the political successes of the early Muslims except as a result of God's favourable involvement. Then, regarding the Qur'an's phrase *wa-fī anfusihim* (*in themselves*), al-Bayḍāwī referred to the marvels (*ʿajāʾib*) of the human body. These marvels were *not* disruptions of habit, but instead evidence for the perfection of God's power (*ʿalā kamāl al-qudra*) and, hence, not beyond human understanding. Along those lines, regarding Q. 21:32, *And We set up the heaven as a roof well-protected; yet still from Our signs they are turning away!*, al-Bayḍāwī explained that the aforementioned signs were evidence for God's existence, unity, perfect power and wisdom; some of these signs were researched in the two sciences of physics and astronomy (*fī ʿilmay al-ṭabīʿa wa'l-hayʾa*).[61] Al-Bayḍāwī was, in fact, reported to have written a summary work (*mukhtaṣar*) of astronomy as well as a commentary on al-Ṭūsī's *Fuṣūl*; neither text is extant.[62]

These albeit brief references to disciplines such as astronomy and physics have led scholars to detect a relationship with al-Rāzī's *Mafātīḥ al-ghayb* (aka *al-Tafsīr al-kabīr*) as well[63] which is evident as well in al-Bayḍāwī's comments on Q. 2:164, *Surely in the creation of the heavens and the earth and the alternation of night and day and the ship that runs in the sea with profit to men, and the water God sends down from heaven therewith reviving the earth after it is dead and His scattering abroad in it all manner of crawling things, and the turning about of the winds and the clouds compelled between heaven and earth – surely there are signs for a people having understanding*. This verse had been the occasion for a lengthy précis of astronomy in al-Rāzī's *Mafātīḥ al-ghayb*.[64] Al-Bayḍāwī's comments were much briefer, noting that others had gone on at greater length, but still informative, and they indicated a familiarity with astronomy. The thrust of al-Bayḍāwī's argument was that the evidence (*dalāla*)[65] for God's existence in Q. 2:164 boiled down to how there were many things that were created in a particular way even though many ways were possible.[66] Al-Bayḍāwī seemed, at first, to refer to the technical terminology of astronomy in order to argue that while there was order in nature, astronomy could not, on its own, justify the existing natural order, as opposed to another possible order. And his comments concluded with an admonition of the nobility of the science of *kalām*.[67] But, upon a closer reading, we shall see that al-Bayḍāwī's willingness to specify the way in which things were created, out of numerous possibilities, meant that *Anwār al-tanzīl* presented arguments squarely in the vein of natural theology.

Al-Bayḍāwī wrote that it was 'conceivable that the heavens not move, or that some of them move like the earth and that they move with the opposite of their [observed] motions. And that it is possible that the [celestial] equator becomes a circle passing through the poles and that they [the heavens] do not have an apex and nadir at all.'[68] The celestial equator is a projection of the earth's equator out towards the heavens.

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Any circle passing through the north and south poles of the heavens would be perpendicular to the celestial equator. Al-Bayḍāwī argued that since the heavens did not inherently have an apex and nadir, their existence was an indication of God's wisdom and superiority over all who might oppose God.[69] Al-Rāzī had made a similar point when he noted that the designation of certain points as the poles, from among all the identical points on the orb, was a reflection of God's wisdom.[70]

Al-Bayḍāwī might have seemed to be saying that there really was no reason comprehensible to humans why things were the way they were, namely why the equator was the equator and not inverted with a circle passing through the celestial poles. Moreover, arguing that the equator and circle passing through the celestial poles could have been exchanged and that the heavens' apex and nadir were not necessarily determined reminds one of al-Ījī's famous comment that astronomy's mathematical constructs, such as the celestial equator, were purely imaginary.[71] Al-Bayḍāwī, however, added some important nuance to the previous sentences, as he said more about why God's decision to place the equator where it was and the circles running through the celestial poles where they actually were could not have been capricious. He wrote: '[it is] in this way owing to its simplicity and the equivalence of its parts.'[72] The placement of the celestial equator, in fact, was not random because the earth's equator, of which the celestial equator was a projection, was also the circle running through locales in which day and night are the same length. Thus, al-Bayḍāwī has stated that the way that God actually created the universe was the *best* option. Moreover, God created the universe according to what his wisdom required (*ʿalā mā tastadʿīhi ḥikmatuhu*).[73] As al-Jurjānī would later say, in response to al-Ījī's charge that astronomy's mathematical constructs were purely imaginary, the circles were correctly imagined.[74] God's wisdom would be palpable only if the celestial equator really was the celestial equator; exploring the mathematical constructs, and, by extension, why they are correct, would yield insight into God's wisdom.

Al-Bayḍāwī also raised the question of the earth's motion in the aforementioned comments ('it is conceivable, for example, that the heavens do not move, or some of it, like the earth, with it moving with the opposite of its [the heavens'] motions').[75] Before, during and after al-Bayḍāwī's lifetime, there was a debate in *ʿilm al-hayʾa* texts among al-Ṭūsī (d. 672/1274), al-Shīrāzī, al-Nīsābūrī and al-Bīrjandī (d. 931–2/1525) about whether the earth's lack of a daily motion could be demonstrated observationally or whether recourse to physics, a branch of *falsafa*, was necessary.[76] To clarify, the earth's annual motion about the sun was *not* being considered.[77] Al-Bayḍāwī took advantage of this debate, just as he did with the debate over the number of orbs, to communicate that there was no reason why God could not have created a moving earth; a stationary earth was by no means necessary. And consider al-Bayḍāwī's comments on Q. 22:65, *He holds back heaven lest it should fall upon the earth, save by His leave? Surely God is All-gentle to men, All-compassionate*: 'that

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which had the inclination to fall could also receive its opposite'.[78] Since the heavens do not fall, and since God created a stationary earth, we have another case where the findings of science match, and therefore communicate, the determinations of God's wisdom.

Al-Bayḍāwī's comments on Q. 55:7, *and heaven – He raised it up, and set the Balance*) made a general point that creation could be a source for insight into the rationale[79] behind God's actions. Al-Bayḍāwī explained, first, that the heavens were the starting point and revealer of God's judgements (*mansha' aqḍiyatihi wa-mutanazzil aḥkāmihi*).[80] God's setting the balance meant that God bestowed on each person was what each deserved (*waffara ʿalā kull mustaʿidd mustaḥaqqahu*). God also ordered the affairs of the world (*intaẓama amr al-ʿālam*) and regulated the system of duties and obligations (*al-ḥuqūq wa'l-mawājib*).[81] Though al-Bayḍāwī did propose a system where the heavens were an intermediary cause of terrestrial events, there was no evidence that he accepted a system of astrology wherein God's judgements might become intelligible by reading the heavens. Rather, examples of order and foresight in nature communicated additional dimensions of God's wisdom. In a comment on Q. 20:53, *He who appointed the earth to be a cradle* (*mahdan*) *for you, and therein threaded roads for you, and sent down water out of heaven, and therewith We have brought forth divers kinds of plants*, al-Bayḍāwī referred to God as *muṭāʿ* ('one who is obeyed') in the course of commenting on *thereby We have brought forth*.[82] The fact that God produced water from the heavens that was then channelled between mountains was part of the evidence (*dalā'il*) for God's wisdom and power. Characterising God as one who is obeyed has overtones of al-Ghazālī's discussion of God's causal role in *Mishkāt al-anwār* ('The Niche of Lights').[83] That characterisation of God also bolstered al-Bayḍāwī's contention, regarding Q. 55:7, that a dimension of that natural order was the reward for and punishment of humans' actions. Just as the Qur'an stated that God was just, al-Bayḍāwī has argued that God's justice is manifested in the natural world.[84] In *Ṭawāliʿ al-anwār*, al-Bayḍāwī wrote that God's wisdom was evident to whoever reflected on the wonders of nature, be they the wonders of the human body or the arrangements of the celestial orbs.[85] In the *tafsīr*, however, al-Bayḍāwī has given many examples of how this wisdom was manifested in nature.

Finally, when al-Bayḍāwī used science to rationalise the occurrence of miracles, his arguments had the effect of making God's actions more transparent. In the case of Q. 17:1, *Glory be to Him, who carried His servant by night from the Holy Mosque to the Further Mosque the precincts of which We have blessed, that We might show him some of Our signs …*), al-Bayḍāwī adduced material from astronomy and geometry to argue why Muḥammad's Night Journey was not impossible, but, instead, entirely conceivable. Al-Bayḍāwī wrote: 'And the impossibility [of the Night Journey] is refuted by how geometry has established that what is between the edges of the disk of

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the sun is a bit over 160 times as big as that [which is] between the edges of the disk of the earth. Consequently, if its [the sun's] lowest edge arrives at the position of its highest edge in less than a second (*thāniya*), with it having been demonstrated in *kalām* that bodies are uniform in receiving accidents, and that God is capable of anything possible, then God is capable of creating the likes of this motion in the body of the Prophet.'[86] Al-Bayḍāwī's comment resembled, but was not identical to, al-Rāzī's.[87] Al-Rāzī had noted the same ratio between the sizes of the earth and sun, but added that when the sun rose, it did so quickly (*fī zamān laṭīf sarīᶜ*), though not necessarily in a second. Since God moves a much larger body so quickly, on a daily basis, moving Muḥammad from Mecca to Jerusalem would be comparatively easy. Science gave greater insight into God's workings; science was never an argument for the suspension of rationalist investigation.

These passages from al-Bayḍāwī's *tafsīr* that read the book of nature to learn about God were notable because they depended on astronomy's conclusions, including those about the relative dimensions of celestial bodies that could not be established purely deductively. *Ṭawāliᶜ al-anwār*, like other *kalām* texts of the time, began with a section on demonstration, perhaps to remind the reader of the unparalleled demonstrative certainty afforded by *kalām*.[88] Al-Bayḍāwī remarked on the difficulties of correct speculative reasoning (*al-naẓar al-ṣaḥīḥ*) when he reported on the geometers' (*al-muhandisūn*)[89] view of correct speculation for knowledge of God, as they denied the possibility of such speculation for theology (*ilāhiyyāt*).[90] One problem that this group saw was that the entity closest to a human was his or her soul, and given disagreements that philosophers had over psychology, how much less certain our knowledge would be regarding the heavens, something far away from humans. Al-Bayḍāwī took this position to be an acknowledgment of how, when the *wahm* ('estimative faculty') works with the intellect, the false can resemble the true.[91] As an indication that al-Bayḍāwī's cautions about knowledge not based on deduction did not diminish the attraction of arguments in the vein of natural theology, al-Iṣfahānī commented that the starting point for inductions about God would be the natural sciences.[92]

Astronomers recognised that some of their conclusions could not be demonstrated deductively, but had found other ways to argue for the truth and/or probative[93] value of their findings.[94] These arguments were reflected in *Anwār al-tanzīl* (but not in *Ṭawāliᶜ al-anwār*). Al-Bayḍāwī investigated, in his comments on Q. 3:190, *Surely in the creation of the heavens and earth and in the alternation of night and day there are signs for men possessed of minds*, how certain people's intellects would be more likely than others to perceive and grasp the signs of God's power in nature through non-deductive processes. Specifically, it was the intellects that are freest from the blemishes of the senses (*al-ḥiss*) and the imagination (*al-wahm*) that were the intended recipients of the signs.[95] It is those whose souls were least corrupted from their

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original *fiṭra* who were most able to grasp the import of God's signs in nature. Those of uncorrupted intellect (*khāliṣa ᶜan shawāᵓib al-ḥiss*) were those best suited to going beyond recognising that nature was a manifestation of God's wisdom to comprehending the manifestations of God's wisdom in nature. Gutas has found that *fiṭra salīma* could be very close to *ḥads* (either 'conjecture' or 'intuition'), suggesting that philosophers and scientists thought that some intellects were better suited than others to grasping the workings of nature.[96] Al-Bayḍāwī justified his interpretation by adducing a *ḥadīth* in which Muḥammad said, 'Woe to he who read it and did not contemplate it.'[97] Al-Bayḍāwī's own comments referred back to the signs mentioned in *Sūrat al-Baqara*, so he must have been thinking of a way for certain people to conceive of or perceive these things without being led astray by their imagination and sense perception. *Anwār al-tanzīl*'s amenability to arguments in the vein of natural theology came from its acceptance of astronomy's non-demonstrative arguments and conclusions as a starting point for reading the book of nature.

A key axis of the debate over astronomy's non-demonstrative methods was about the reality of mental existents; al-Bayḍāwī expressed his concerns, in *Ṭawāliᶜ al-anwār*, over how the existence of mental existents was demonstrated. He reported that the philosophers (*ḥukamāᵓ*) classified existence as either external (*khārijī*) or mental (*dhihnī*), whereas the *mutakallimūn* classified existence into that which had no predecessor (*mā lā awwal li-wujūdihi*) and into that which did.[98] Al-Bayḍāwī commented that he would not accept something's mental existence without a proof.[99] Al-Iṣfahānī explained: 'If it were said: how is it possible to doubt something's mental existence, while that thing is being conceived (*ᶜinda taṣawwur al-shayᵓ*), as conceiving it consists of its being in the mind, one would respond that while conceiving something consists of its existence in the mind, the conception of that thing is not that thing itself, but is instead added to that thing. Thus it is possible for us to doubt its mental existence, while a conception of it is being formed, and it is possible to deny something's mental existence while acknowledging that it is being conceived of.'[100] Along those lines, al-Bayḍāwī denied that the Platonic forms were eternally (thus necessarily) existent.[101]

Al-Bayḍāwī's predecessor Naṣīr al-Dīn al-Ṭūsī wrote a brief treatise on a mode of existence known as *nafs al-amr* ('the thing in itself'). This was a mode of existence that did not arise in *Ṭawāliᶜ al-anwār* (or in al-Ījī's *Mawāqif*), but was clearly important as a foundation for arguments made in the vein of natural theology.[102] In that treatise, al-Ṭūsī argued that mathematical ideas could have a real existence beyond their conception in the intellect.[103] When an intelligent person judged (*ḥakama*) that the diagonal of a quadrilateral was not common with its side (as opposed to an ignoramus who judged that they were), this had to occur through a comparison/confirmation (*muṭābaqa*) with something called *nafs al-amr*. The *nafs al-amr* existed outside of the intellect, but did not have a position (*ghayr dhī waḍᶜ*).[104]

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It did not exist by having a position because it could not be described through the categories nor could it be attained through sense perception. The *nafs al-amr* could exist on its own without a connection to any other existent. One could come to a conclusion about the diagonal of a quadrilateral without comparison to any material quadrilateral. The *nafs al-amr* was not God because the *nafs al-amr* entailed multiplicity, while God did not, nor was the *nafs al-amr* equivalent to the forms because the forms existed through something else (*kānat qāʾima bi-ghayrihā*), while the *nafs al-amr* did not.[105] Al-Ṭūsī concluded that the *nafs al-amr* was the universal intellect (*ʿaql al-kull*), which he identified with the Qur'an's references to *al-lawḥ al-maḥfūẓ* and *al-kitāb al-mubīn*.[106] Al-Ṭūsī's argument about the *nafs al-amr* meant that the source of astronomy's mathematical constructs was God and that something that existed in the *nafs al-amr* was true even if its existence could not be established through deduction. Though I have not found al-Bayḍāwī discussing the concept of *nafs al-amr* in the *tafsīr*, accepting it as a mode of existence would certainly make arguments in the vein of natural theology, particularly those founded on astronomy's mathematical constructs, more authoritative.

Al-Bayḍāwī's position in *kalām*, that some theories of astronomy were not only not demonstrable but also possibly wrong, stemmed from the underlying position that mental existence without a corresponding external existent was impossible. Nevertheless, al-Bayḍāwī did hold, in *Ṭawāliʿ al-anwār*, that study of the natural world, including the heavens, could enhance one's appreciation of God's wisdom. Such study would be all the more worthwhile the more one had confidence in the findings of science. Al-Bayḍāwī's *tafsīr* (*Anwār al-tanzīl*) shows us that there was another discourse about the use of disciplines such as astronomy in religious texts, for fields such as astronomy could give greater insight into God's creation than they did in *kalām* texts. The ability of scientists to argue in the vein of natural theology was a strong position and one that must have compensated for their methods of demonstration that could not always be rigorously deductive. How else to explain al-Bayḍāwī's relative preference for natural theological arguments in *Anwār al-tanzīl*? Thus, the *mutakallimūn*'s criticisms of astronomy must have been intended to weaken a worthy rival.

While commenting on Q. 2:22, *wherewith He brought forth fruits for your provision*, al-Bayḍāwī explained that it was within God's power to create without intermediate causes (*qādir ʿalā an yūjid al-ashyāʾ bi-lā asbāb*), for God created the intermediate causes themselves without intermediate causes.[107] Yet, al-Bayḍāwī held that those possessed of insight (*ulū al-abṣār*) would have renewed opportunties to understand God's admonitions (*ʿibar*) and power (*qudra*) only through the operation of natural processes, but not if God created everything at once (*laysa fī ījādihā dufʿatan*). Al-Bayḍāwī has said either that God in fact runs the cosmos through natural processes, though God could have chosen not to do so, in order to facilitate arguments

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in the vein of natural theology, or al-Bayḍāwī has said that while one cannot exclude the possibility of God creating everything in an instant, there are advantages to thinking about God's involvement in the cosmos in a less occasionalist way.[108] At any rate, both conclusions favoured arguments in the vein of natural theology.

NOTES

1 See Matthew Barker, *Natural Theology, or the Knowledge of God, from the Works of Creation; Accommodated and Improved, to the Service of Christianity* (London: Printed for Nathaniel Ranew, 1674; accessed through http://eebo.chadwyck.com), B2v. These duties should be contrasted to those that are known only through revelation (Barker, *Natural Theology*, A5r). Barker wrote: 'By Natural Theology, that all may understand, I mean that knowledge of God, and our duty to Him, which the Light of Nature may lead Man up to, and which is *concreat* with his Soul. The Image of God upon Man in his first Creation, confided in Knowledge as well as Holiness and the knowledge Adam had of his Creator, was partly by the Character of his Being being engraven upon his Soul, which is by some stiled [*sic*] verbum εμφυτον, an implanted Word, and partly by what the large power of his intellectual Faculty might gather from the Works of Creation; by both which he was led to God as his ultimate end.' In support, Barker cited Romans 1:20. The Gifford Lectures (www.giffordlectures.org) in Scotland attest to the continuing currency of natural theology.

2 Romans 1:20 (NRSV) reads: 'Ever since the creation of the world his eternal power and divine nature, invisible though they are, have been understood and seen through the things he has made'.

3 William Paley, *Natural Theology, or, Evidences of the Existence and Attributes of the Deity: Collected from the Appearances of Nature* (Albany: Printed for Daniel and Samuel Whiting, 1803).

4 Peter Harrison, 'Natural Theology, Deism, and Early Modern Science' in Arri Eisen and Gary Laderman (eds), *Science, Religion, and Society* (2 vols. Armonk, NY and London: M.E. Sharpe, 2007), vol. 2, pp. 426–33, at pp. 427–8.

5 This paper will discuss some of these verses. See, e.g. Q. 3:190, *Surely in the creation of the heavens and earth and in the alternation of night and day there are signs for men possessed of minds* (this and all following translations are from Arberry).

6 Q. 30:30, *So set they face to the religion, a man of pure faith* (*ḥanīfan*) – *God's original* (*fiṭrata'llāh*) *upon which He originated mankind* (*faṭara'l-nās ʿalayhā*). *There is no changing God's creation. That is the right religion; but most men know it not*, mentions both the word *ḥanīf* and *fiṭra*. Although *fiṭra* is spelled with a *tāʾ*, not a *tāʾ marbūṭa*, al-Bayḍāwī (*Anwār al-tanzīl* (2 vols. Beirut: Dār al-Kutub al-ʿIlmiyya, 1988), vol. 2, p. 220), reads the word as a noun.

7 Alistair McGrath, *Open Secret: A New Vision for Natural Theology* (Oxford: Blackwell, 2009), p. 181: 'Islam recognizes no true knowledge of God outside the Qu'ran [*sic*!], raising serious difficulties for any notion of natural theology.' Qur'an should be emended to 'revelation'; but, again, the Qur'an appeals to nature, which is why some of the most extensive discussions in the vein of natural theology in Islam are found in *tafsīr*. While McGrath (p. 182) cited Richard Frank's work and realised that *kalām* could also include discussions in the vein of natural theology, McGrath understood al-Ghazālī to be critical not only of *kalām*, but rationalism in general, a view Frank himself (see *al-Ghazālī and the Ash'arite School* (Durham, NC: Duke University Press, 1994)) has debunked.

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8 Anver Emon, 'Natural Law and Natural Rights in Islamic Law', *Journal of Law and Religion* 20 (2004–5), pp. 351–95, at p. 361.

9 The principle of moderation could be better understood from a study of nature. See Robert Morrison, *Islam and Science: The Intellectual Career of Niẓām al-Dīn al-Nīsābūrī* (Oxon: Routledge, 2007), p. 71. The mean could not be determined without any assistance from revelation though. Rather, studying nature communicated the rationality of the *sharīᶜa*. Cf., too, al-Rāzī's comment on Q. 2:22 (*Mafātīḥ al-ghayb*, 2nd edn (32 vols in 16, Beirut: Dār Iḥyāʾ al-Turāth al-ᶜArabī, n.d.), vol. 2, p. 111) which held that the connection between sickness, medicine and health mirrored the connection between humans' obligations, good deeds and reward.

10 Lutpi Ibrahim, 'The Relation of Reason and Revelation in the Theology of az-Zamakhsharī and al-Bayḍāwī', *Islamic Culture* 54 (1980), pp. 63–74 at p. 65. These limits surfaced in al-Bayḍāwī's comments on Q. 4:65, *But no, by thy Lord! They will not believe till they make thee the judge regarding the disagreement between them, then they shall find in themselves no impediment touching thy verdict, but shall surrender in full submission.*

11 A.H. Johns, 'Exegesis as an Expression of Islamic Humanism: Approaches, Concerns, and Insights of al-Baydawi', *Hamdard Islamicus* 22 (1999), pp. 37–58, at p. 38.

12 Charles Melville, 'Qāḍī Bayḍāwī's *Niẓām al-tawārīkh* in the *Safīna-yi Tabrīz*: An Early Witness of the Text' in A.A. Seyed-Gohrab and S. McGlinn (eds), *The Treasury of Tabriz: The Great Il-Khanid Compendium* (Amsterdam and West Lafayette, IN: Rozenberg Publishers and Purdue University Press, 2007), pp. 91–102, at pp. 94–5.

13 Andrew March, 'The Post-Legal Ethics of Tariq Ramadan: Persuasion and Performance in *Radical Reform: Islamic Ethics and Liberation*', *Middle East Law and Governance* 2 (2010), pp. 253–73. Al-Bayḍāwī, the focus of this article, has been cited by more modern practitioners of *tafsīr ᶜilmī*. See al-ᶜAzīz Ḥājī, *al-Bayḍāwī mufassiran* (Damascus: Dār al-Ḥasanayn, 2000), pp. 377–81, esp. p. 377.

14 Al-Nīsābūrī's *tafsīr*, entitled *Gharāʾib al-Qurʾān* followed (but did not always agree with) al-Rāzī's *al-Tafsīr al-kabīr*. See Morrison, *Islam and Science*, ch. 6. Ahmad Dallal (Ahmad Dallal, art. 'Science and the Qur'an' in *Encyclopaedia of the Qurʾān*) with justification called (p. 551) al-Rāzī's (d. 606/1210) *tafsīr* (*Mafātīḥ al-ghayb*) the most important example of scientifically and philosophically-informed *tafsīr*. See also Tariq Jaffer, *Faḫr al-Dīn al-Rāzī (d. 606–1210): Philosopher and Theologian as Exegete* (unpublished PhD dissertation: Yale University, 2005).

In Christian civilizations, a discipline known as natural philosophy, which Andrew Cunningham has argued ('The Identity of Natural Philosophy: A Response to Edward Grant', *Early Science and Medicine* 5 (2000), pp. 259–78) was different from science, emerged. See also Peter Harrison, 'Curiosity, Forbidden Knowledge, and the Reformation of Natural Philosophy in Early-Modern England', *Isis* 92 (2001), pp. 265–90.

15 See Nahyan Fancy, 'The Virtuous Son of the Rational: A Traditionalist's Response to the Falāsifa' in Y. Tzvi Langermann (ed.), *Avicenna and His Legacy: A Golden Age of Science and Philosophy* (Brepols: Turnhout, 2009), pp. 217–47. Fancy showed that Ibn al-Nafīs' ideas about resurrection were relevant to his work in medicine. See also Heidrun Eichner, *The Post-Avicennian Philosophical Tradition and Islamic Orthodoxy. Philosophical and Theological summae in Context* (Habilitationsschrift: Martin-Luther-Universität Halle-Wittenberg, 2009), p. 285, on how al-ᶜUrḍī's (d. 664/1266) *Kitāb al-hayʾa* likely emerged in the context of a discussion with *mutakallimūn*.

16 A.I. Sabra, 'Science and Philosophy in Medieval Islamic Theology: The Evidence of the Fourteenth Century', *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 9 (1994), pp. 1–42. See also Josef van Ess, *Der Erkenntnislehre des 'Aḍudaddin al-Īcī*

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(Wiesbaden: Franz Steiner, 1966). For more on the development of *kalām*'s ontological orientation, see Eichner, *The Post-Avicennian Philosophical Tradition*. See also A.I. Sabra, '*Kalām* Atomism as an Alternative Philosophy to Hellenizing Falsafa' in James E. Montgomery (ed.), *Arabic Theology, Arabic Philosophy: Essays in Celebration of Richard M. Frank*, Orientalia Lovaniencia Analecta, 152 (Leuven: Peeters, 2006), pp. 199–272.

17 Sabra, 'Science and Philosophy', p. 12: 'Another feature of this second phase was a growing tendency among the *mutakallimūn* to delve into the works of the *falāsifa* whose views and arguments they reported, summarized, and rebutted.'

18 Muʾayyad al-Dīn al-Ījī (ed. ʿAbd al-Raḥmān ʿUmayra), *Kitāb al-mawāqif* (with al-Jurjānī's commentary) (3 vols. Beirut: Dār al-Jīl, 1997), vol. 2, pp. 493–4. Al-Ījī wrote: 'Water flows, naturally, to the depressions, and the hills are found to be a source of life (*maʿāsh*) for animals and vegetables. No reason for it has been mentioned except for God's providence/solicitude (*ʿināya*) in animals and plants, for without that their creation and endurance would not be possible.'

19 Sabra, 'Science and Theology', p. 38: 'this suggests an instrumentalist (or fictionalist) view of the mathematical astronomy of his time.'

20 Robert Morrison, 'What *Was* the Purpose of Astronomy in Ījī's *Kitāb al-mawāqif fī ʿilm al-kalām*?', forthcoming.

21 Al-Ījī, *Mawāqif*, vol. 2, p. 451: '*wa-fī'l-kull fa-inna ḥarakāt al-aflāk irādiyya fa-mādhā yamnaʿ an takhtalif bi-ḥasab mā yataʿāqab ʿalayhā min irādāt juz'iyya?*' On the same page, al-Ījī attributed the astronomers' frustration with the equant to their insistence on uniform rotation.

22 Sabra brought al-Sayyid al-Sharīf al-Jurjānī's (d. 816/1413) rebuttal of al-Ījī's dismissal of astronomers' mathematical constructs as imaginary to scholars' attention in 'Science and Philosophy', p. 37 (following *Mawāqif*, vol. 2, p. 432). Sabra's translation was: 'they are "correctly imagined (*mutakhayyala takhayyulan ṣaḥīḥan*) in accordance with what things are in themselves (*fī nafs al-amr*)".' For al-Jurjānī's independent treatise on *nafs al-amr*, see Recep Duran, 'Nefsu'l-emr Risaleleri', *Bilim ve Felsefe Metinleri* (1992), pp. 77–102.

23 Cf. F. Jamil Ragep: 'Freeing Astronomy from Philosophy', *Osiris* 16 (2001), pp. 49–71, at p. 56. See also Morrison, *Islam and Science*, pp. 109–12, for al-Nīsābūrī's rejection of al-Rāzī's false representation of the movement of the fixed stars.

24 Again, see McGrath, *Open Secret*, p. 182. The tendency to overlook *tafsīr* cannot be attributed simply to a lack of interest in Islam. Annemarie Schimmel's 1992 Gifford Lectures were published as *Deciphering the Signs of God: A Phenomenological Approach to Islam* (Edinburgh: Edinburgh University Press, 1994). This book drew on Qur'anic interpretation in that the numerous Ṣūfī authors she referenced were trying to understand the Qur'an; Schimmel herself offered her own interpretations. But Schimmel did not much discuss texts in the specific genre of *tafsīr*. More specialised work (e.g. Dallal, 'Science and the Qur'ān') has begun to probe *tafsīr*.

25 Though not a topic that this article investigates, al-Bayḍāwī was also a Shāfiʿī chief justice in Shīrāz. See Shams al-Dīn al-Dāʾūdī, *Ṭabaqāt al-mufassirīn* (2 vols. Beirut: Dār al-Kutub al-ʿIlmiyya, 1983), vol. 1, pp. 248–9. The bulk of the report conveys an anecdote about al-Bayḍāwī, as an unknown in Tabrīz, resolving a complicated question in a lesson at a *majlis*.

26 Eichner, *The Post-Avicennian Philosophical Tradition*, p. 373. One can see how certain passages in the *Mawāqif* were expansions on terser statements in the *Ṭawāliʿ al-anwār*. Sabra ('Science and Philosophy', p. 13) had noted this connection as well.

27 Al-Bayḍāwī, *Ṭawāliʿ al-anwār*, ed. ʿAbbās Sulaymān (Beirut: Dār al-Jīl & Cairo: al-Maktaba al-Azhariyya li'l-Turāth, 1991), p. 140. More commonly (Aristotle, *De Caelo*,

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290a), the proof that the moon could not be rotating in an epicycle is that the same side of the moon is always visible.

28 Al-Ghazālī (in *The Incoherence of the Philosophers*, tr. Marmura (Provo, UT: Brigham Young University Press, 1997), p. 6), acknowledged that the proofs were correct and founded on arithmetic and geometry. Al-Ghazālī did not mention the role of *ḥads* ('conjecture', 'intuition') in the astronomers' demonstration. The case of eclipses, though, was an example that Ibn Sīnā gave for *ḥads* in *Kitāb al-burhān*. See Ibn Sīnā, *al-Shifāʾ: Kitāb al-burhān*, ed. A.E. ʿAffīfī (Cairo: General Egyptian Book Organization, 1956), p. 259. For another reference to *ḥads*, see Ibn Sīnā, *al-Ishārāt wa'l-tanbīhāt maʿa sharḥ Naṣīr al-Dīn al-Ṭūsī*, ed. Sulaymān Dunyā (3 vols. Cairo: Dār al-Maʿārif, n.d.), vol. 2, p. 207. Dimitri Gutas has identified a revised version of *ḥads* in which the middle term of the syllogism could be acquired instantaneously or through thinking (*fikr*). See Dimitri Gutas, 'Intuition and Thinking: The Evolving Structure of Avicenna's Epistemology' in Robert Wisnovsky (ed.), *Aspects of Avicenna* (Princeton: Markus Wiener Publishers, 2001), pp. 3–4.

29 Maḥmūd al-Iṣfahānī, *Maṭāliʿ al-anẓār fī sharḥ Ṭawāliʿ al-anwār* (Istanbul: n.p, 1887–8), p. 265. This printed edition includes the gloss (*ḥāshiya*) of al-Sayyid al-Sharīf al-Jurjānī. That is, al-Bayḍāwī was correct to say that the occurrence of eclipses disproved the proposal that half of the moon might be luminous, with the moon rotating on its own. However, without taking into account the five degree inclination of the path of the moon, the fact that not all oppositions led to eclipses might mean that the sun did not illuminate the moon. Because al-Iṣfahānī's other comments evinced a sympathy toward the astronomers' conclusions, al-Iṣfahānī might have been interested in rebutting the implication, which would follow from the moon's not being self-luminous, that the celestial bodies were not uniform and/or that, perhaps, other planets were also not self-luminous for as yet unknown reasons.

30 Al-Ījī, *Mawāqif*, vol. 2, p. 463.

31 Eichner, *Post-Avicennian Philosophical Tradition*.

32 Josef van Ess, *Der Wesir und seine Gelehrten* (Wiesbaden: Franz Steiner, 1981), p. 29 and p. 48. Al-Ījī is listed as ''Aḍudaddīn 'Abdarraḥmān b. Aḥmad al-Muṭarrizī', whom van Ess took to be al-Ījī. Al-Ījī's father and brother were also in contact with Rashīd al-Dīn (d. 719/1319). See Eichner, *The Post-Avicennian Philosophical Tradition*, p. 378, for the importance of the milieu of Tabrīz in shaping al-Ījī's *kalām*.

33 Morrison, *Islam and Science*, p. 110.

34 Robert Wisnovsky, 'Avicenna and the Avicennan Tradition' in P. Adamson and R. Taylor (eds), *The Cambridge Companion to Arabic Philosophy* (Cambridge: Cambridge University Press, 2005), pp. 92–136, at pp. 112–3.

35 Walid Saleh ('Preliminary Remarks on the Historiography of *tafsīr* in Arabic: A History of the Book Approach', *Journal of Qur'anic Studies* 12 (2010), pp. 6–40, at p. 21) has categorised *Anwār al-tanzīl* as a *madrasa*-style *tafsīr*. According to Saleh, rather than being encyclopaedic, *madrasa*-style commentaries reflected a certain rationale for their composition.

36 Al-Iṣfahānī was known to Rashīd al-Dīn; see van Ess, *Der Wesir*, p. 24.

37 Al-Iṣfahānī, *Maṭāliʿ al-anẓār fī sharḥ Ṭawāliʿ al-anwār*. Al-Iṣfahānī studied with al-Bayḍāwī in Tabrīz in the last decade of the seventh/thirteenth century and first decade of the eighth/fourteenth (Edwin E. Calverley and James W. Pollock (ed. and tr.), *Nature, Man and God in Medieval Islam: ʿAbd Allah Baydawi's Text, Tawaliʿ al-anwar min matāliʿ al-anzar, along with Mahmud Isfahani's Commentary, Matāliʿ al-anzar, sharh Tawaliʿ al-anwar* (Leiden & Boston: Brill, 2002), p. xxix. The commentary itself was not finished until the 1330s (Calverley and Pollock, *Nature, Man and God*, p. xliii)).

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38 For more commentaries on *Ṭawāliᶜ al-anwār*, see Carl Brockelmann, *Geschichte der arabischen litteratur* (Leiden: Brill, 1943), vol. 1, p. 533. Al-Iṣfahānī's own commentary spawned a gloss by al-Jurjānī and a super-gloss by al-Dawwānī. For a better list, see, now, Robert Wisnovsky, 'The Nature and Scope of Arabic Philosophical Commentary in Post-classical (*c.* 1100–1900 AD) Islamic Intellectual History: Some Preliminary Observations' in P. Adamson, H. Baltussen and M.W.F. Stone (eds), *Philosophy, Science and Exegesis in Greek, Arabic and Latin Commentaries, Vol. 2, Supplement to the Bulletin of the Institute Of Classical Studies* 83:1–2 (London: Institute of Classical Studies, 2004), pp. 149–91, at p. 177.

39 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, pp. 133–5.

40 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, p. 138 ff.

41 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, p. 138. Al-Bayḍāwī wrote that, according to the philosophers (*ḥukamāᵓ*), the simple bodies were spherical since bodies of a single nature did not require multiple forms. Al-Iṣfahānī's commentary (*Maṭāliᶜ al-anẓār*, p. 258) agreed that the simple bodies were spherical.

42 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, p. 139. Al-Iṣfahānī's commentary (*Maṭāliᶜ al-anẓār*, p. 258) laid out, from the point of view of the astronomers, some of the philosophical principles of the investigation of the celestial orbs. These were: attributing each motion to a single body moving through its essence (*jism mutaḥarrik bi'l-dhāt*), a body moving what it encompasses accidentally (*bi'l-ᶜaraḍ*), the simple motions of the orbs were continuous, the orbs' motions were uniform, and the orbs cannot be pierced or mended.

43 Al-Ṭūsī had acknowledged the possibility of attributing the daily motion to the cosmos as a whole in the *Tadhkira*. See al-Ṭūsī, *Naṣīr al-Dīn al-Ṭūsī's Memoir on Astronomy (al-Tadhkira fī 'ilm al-hay'a)*, ed., tr. and comm. F.J. Ragep (2 vols. New York, Heidelberg, Berlin: Springer-Verlag, 1993), vol. 1, p. 140. Al-Ṭūsī's reason for preferring a nine-orb cosmos, that the fixed stars had two motions, was identified as incorrect by al-Shīrāzī (*Faᶜalta fa-lā talum*, Istanbul Fatih MS 3175/2, 168r).

44 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, p. 139.

45 Sabra, 'Science and Theology', p. 35. Sabra discussed both the precedent for the idea of rings in Ptolemy's *Planetary Hypotheses* and the later appearance of the idea in al-Ījī's *Mawāqif*.

46 Al-Iṣfahānī, *Maṭāliᶜ al-anẓār*, p. 262.

47 Al-Jurjānī, *Ḥāshiyat tajrīd al-ᶜaqāᵓid* (in the margins of *Maṭāliᶜ al-anẓār*), p. 258. Arabic: '*fa-lam yumkinhum al-istidlāl bihā ᶜalā tilka al-aḥkām al-mabniya ᶜalayhā*'.

48 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, pp. 137–8. One of these rejected arguments was the forms' imagined divisibility (*al-qisma al-wahmiyya*) entailed their physical divisibility and connection to matter.

49 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, p. 138.

50 Al-Iṣfahānī, *Maṭāliᶜ al-anẓār*, pp. 256–7.

51 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, p. 140.

52 Dallal, *Islam, Science, and the Challenge of History*, (New Haven and London: Yale University Press), p. 135: 'In fact, despite his strong polemical stance, Al-Ījī recognises in several places the authority of the fragmented internal knowledge that he excludes from theology. In one instance, Al-Ījī uses a geometrical hypothesis (*farḍ*) to prove the finitude of distances.' Dallal was correct to point out that the question was not simply one of whether al-Ījī trusted science. Al-Ījī did not, though, see science as separate from *kalām* as Dallal suggested (pp. 132–3), but science was, instead, a competitor as a source of speculation about God.

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53 Walid Saleh, *The Formation of the Classical Tafsīr Tradition; The Qurʾān Commentary of al-Thaʿlabī* (Leiden & Boston: Brill, 2004), p. 2.

54 Al-Bayḍāwī mentioned his *kalām* text in his *tafsīr*. See Ḥājī, *al-Bayḍāwī mufassiran*, p. 77.

55 Yusuf Rahman, 'Hermeneutics of al-Bayḍāwī in his *Anwār al-tanzīl wa-asrār al-taʾwīl*', *Islamic Culture* 71 (1997), at p. 4. See also al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 3 on the rank of *tafsīr*: '*huwa raʾīs al-ʿulūm al-dīniyya wa-raʾsuhā wa-mabnā qawāʿid al-sharʿ wa-asāsuhā.*'

56 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 3: '*illā man baraʿ fī'l-ʿulūm al-dīniyya kullihā uṣūlihā wa-furūʿihā, wa-fāq fī'l-ṣināʿāt al-ʿArabiyya wa'l-funūn al-adabiyya bi-anwāʿihā.*' See also Saleh, *The Formation*, p. 16, where Saleh introduced the typology of encyclopaedic and *madrasa* Qur'an commentaries.

57 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 48. See also Morrison, *Islam and Science*, pp. 115–6 for al-Nīsābūrī's reference, in his own *tafsīr*, to discussions of the number of orbs in astronomy texts.

58 Quṭb al-Dīn al-Shīrāzī, *Faʾalta fa-lā talum*, Fatih MS 3175/2, 168r. See also Ragep (ed., tr. and comm.), *Tadhkira*. p. 390. One necessary feature of a seven-orb cosmos would be a single soul that would move that entire cosmos with the daily motion, meaning that each individual orb would then be moved by two souls.

59 Anthony Johns (Johns, 'Exegesis', p. 38) has remarked both that such a characterisation of al-Bayḍāwī is a simplification and that al-Bayḍāwī has achieved greater respect in the Islamic world than he has among Western scholars of Islam. A well-known earlier work, also on al-Bayḍāwī's interpretation of Q 12 is A.F.L. Beeston, *Baiḍāwī's Commentary on Sūrah 12 of the Qur'ān* (Oxford: Clarendon Press, 1963).

Andrew Lane (*A Traditional Muʿtazilite Qur'ān Commentary: The Kashshāf of Jār Allāh al-Zamakhsharī (d. 538/1144)* (Leiden & Boston: Brill, 2006), pp. 89–90) took up the relationship between al-Zamakhshārī's *Kashshāf* and *Anwār al-tanzīl*. Lane commented, 'In his task of "de-Mu'tazilizing" the *Kashshāf*, al-Bayḍāwī was only partially successful, for later authors composed works in which they noted what he had overlooked or had not realized was heretical'. The passages studied in this article did not exist in the *Kashshāf*. Muḥammad al-Ṭāhir Ibn ʿĀshūr (*al-Tafsīr wa-rijāluhu* (Tunis: Dār al-Salām, 2008), p. 105) has noticed that the author of glosses (*ḥawāshī*) on the *Kashshāf* also wrote glosses on *Anwār al-tanzīl*, indicating that the two texts were studied together.

60 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 2, p. 357.

61 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 2, p. 69.

62 Muḥammad al-Zuḥaylī, *al-Qāḍī al-Bayḍāwī: al-mufassir, al-uṣūlī, al-mutakallim, al-faqīh, al-muʾarrikh, al-adīb, ṣāḥib al-taṣānīf al-mashhūra* (Damascus: Dār al-Qalam, 1988), p. 176. See also Ḥājī, *al-Bayḍāwī mufassiran*, p. 84.

63 Although *Anwār al-tanzīl* does not have the extensive philosophic commentary of al-Rāzī, at least one modern scholar has observed that al-Bayḍāwī's *tafsīr* did capture the philosophic spirit of *Mafātīḥ al-ghayb*. See Ibn ʿĀshūr, *al-Tafsīr wa-rijāluhu*, pp. 100–2. For more on the connection between al-Bayḍāwī and al-Rāzī's *tafāsīr*, see Ḥājī, *Bayḍāwī mufassiran*, pp. 169–77.

64 Al-Rāzī, *Mafātīḥ al-ghayb*, vol. 4, pp. 177–203.

65 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 98. Al-Bayḍāwī commented that the evidence for the existence and oneness of God in these verses was so plentiful that that a detailed explanation would be quite lengthy.

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66 See also Jār Allāh al-Zamakhsharī, *al-Kashshāf ʿan ḥaqāʾiq al-tanzīl* (4 vols. Beirut: Dār al-Maʿrifa, n.d.) vol. 1, pp. 105–6. There is no overlap between al-Bayḍāwī's comments and al-Zamakhsharī's.

67 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 98. Al-Bayḍāwī's comments concluded by citing Q. 21:22, *Why, were there gods in earth and heaven other than God, they would surely go to ruin; so glory be to God, the Lord of the Throne above that they describe!*

68 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 98.

69 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 98.

70 Al-Rāzī, *Mafātīḥ al-ghayb*, vol. 4, p. 187.

71 Al-Bayḍāwī, *Mawāqif*, vol. 2, p. 410. See also Sabra, 'Science and Theology', p. 37. Sabra took these comments as a reflection of al-Ījī's position that the astronomers' physical explanations were, at best, contingent and of al-Ījī's instrumentalist position regarding astronomy's theoretical models.

72 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 98.

73 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 98.

74 Al-Bayḍāwī, *Mawāqif* (which contains al-Jurjānī's commentary), vol. 2, p. 432. See also Sabra, 'Science and Theology', p. 37.

75 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 98.

76 F. Jamil Ragep, 'Ṭūsī and Copernicus: The Earth's Motion in Context', *Science in Context* 14 (2001), pp. 145–63. The conclusions of *falsafa* (p. 155) were only persuasive (*iqnāʿī*), not certain. On al-Bīrjandī, see Robert Morrison, 'The Division Between *Falsafa* and Astronomy' in Tzvi Langermann (ed.), *Avicenna and his Heritage: A Golden Age of Science and Philosophy* (Turnhout: Brepols, 2009), pp. 307–26, at pp. 321–6.

77 Portions of the Qur'an, e.g. Q. 36:38–40, mention a moving sun. The Earth's daily motion about its axis would not contradict these Qur'anic verses describing a moving sun.

78 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 2, p. 95.

79 Al-Nīsābūrī wrote (*Gharāʾib al-Qurʾān*, in the margins of al-Ṭabarī's *Jāmiʿ al-bayān* (Beirut: Dār al-Maʿrifa, 1992), vol. 1, p. 98) that using the appetitive faculty according to the *sharīʿa* reflected the mean (*al-wasaṭ*). See also Morrison, *Islam and Science*, p. 71.

80 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 2, p. 451.

81 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 2, pp. 451–2.

82 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 2, p. 49.

83 Frank Griffel, *Ghazālī's Philosophical Theology* (Oxford: Oxford University Press, 2009), p. 253. When describing the fourth group in the veil section of *The Niche*, 'for al-Ghazālī, the being that in al-Fārābī and Avicenna's cosmology bestows existence upon others and is obeyed (*muṭāʿ*) by the movers of the spheres is the first creation of the real God. Indeed, the real God does little more than create the one who is obeyed …'.

84 Indeed, with al-Nīsābūrī, God's ability to control humans' actions afforded the scientifically-inclined more opportunities to find examples of God's wisdom in the natural world. Cf., too, al-Rāzī's comment on Q. 2:22 (*Mafātīḥ al-ghayb*, vol. 2, p. 111) which held that the connection between sickness, medicine and health mirrored the connection between humans' obligations, good deeds and reward.

85 Al-Bayḍāwī, *Ṭawāliʿ al-anwār*, p. 181.

86 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 564. See, also, Muḥammad Bilāl Ḥusayn, *al-Qāḍī Nāṣir al-Dīn al-Bayḍāwī wa-athruhu fī tafsīr al-Qurʾān al-karīm* (Cairo: Dār al-Baṣāʾir, 2010),

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p. 100. Ḥusayn pointed to this comment as evidence both for al-Bayḍāwī's engagement with science and for al-Bayḍāwī's dependence on al-Rāzī's *tafsīr*.

87 Al-Rāzī, *Mafātīḥ al-ghayb*, vol. 20, p. 148.

88 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, pp. 55–69.

89 The geometers may have been primarily a group of sceptics, rather than practitioners of the mathematical sciences. Al-Ījī (van Ess, *Erkenntnislehre*, pp. 274–6) understood the *muhandisūn* to be sceptics who denied the possibility of real knowledge beyond sense perception. Still, al-Ījī (*Erkenntnislehre*, p. 276) saw himself as one who borrowed a great deal from geometry, so these *muhandisūn* may have been, perhaps for al-Bayḍāwī as well, a friendly group.

90 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, pp. 65–6.

91 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, p. 67.

92 Al-Iṣfahānī, *Maṭāliᶜ al-anẓār*, p. 76. 'The starting point of the intellect in theological issues (*al-masāᵓil al-ilāhiyya*) is perceived by the estimative faculty (*al-wahm*)'.

93 Niẓām al-Dīn al-Nīsābūrī (Morrison, *Islam and Science*, p. 70) wrote that *fiqh* and *ᶜilm al-hayᵓa* had similar methodologies.

94 Muᵓayyad al-Dīn al-ᶜUrḍī (d. 664/1266) was the astronomer most concerned with the epistemological validity of astronomy. See al-ᶜUrḍī (ed. Saliba), *Kitāb al-hayᵓa* (Beirut: Markaz Dirāsāt al-Waḥda al-ᶜArabiyya, 1990), p. 212. See also George Saliba, *Islamic Science and the Making of the European Renaissance* (Cambridge and London: MIT Press, 2007), p. 106. For more on astronomers' arguments for the validity of their conclusions, see Bernard R. Goldstein, 'The Arabic Version of Ptolemy's Planetary Hypotheses', *Transactions of the American Philosophical Society, New Series* 57:4 (1967), pp. 3–55, at pp. 37–8.

95 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 195.

96 Dimitri Gutas, *Avicenna and the Aristotelian Tradition* (Leiden: Brill, 1988), p. 170. Reference to *fiṭra salīma* was also part of al-Jurjānī's defense of astronomy in his commentary on the *Mawāqif*; see Sabra, 'Science and Philosophy', p. 39. In *al-Tuḥfa al-shāhiyya* (Paris MS Arabe 2516, 8v), al-Shīrāzī attributed the astronomers' decision not to pursue a seven-orb cosmos to *fiṭra salīma*.

97 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 195. Arabic: '*wayl li-man qaraᵓahā wa-lam yatafakkur fīhā*'.

98 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, pp. 75–6.

99 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, p. 78.

100 Al-Iṣfahānī, *Maṭāliᶜ al-anẓār*, p. 86.

101 Al-Bayḍāwī, *Ṭawāliᶜ al-anwār*, p. 83.

102 See Sabra, 'Science and Philosophy', p. 39. The conception of *nafs al-amr* (translated by Sabra as 'what things are in themselves') played a role in al-Jurjānī's defense of the reality of astronomy's geometrical constructions against al-Ījī's criticisms.

103 For al-Ṭūsī's treatise *Risālat ithbāt jawhar mufāraq*, see Muḥammad Mudarrisī Zanjānī (ed.), *Sargudhast wa-ᶜaqāᵓid-i falsafī-yi Naṣīr al-Dīn Ṭūsī* (Tehran: Intishārāt-i Dānishgāh-i Tihrān #309, 1957), pp. 169–72. The same treatise is also found in Muḥammad Taqī Mudarris Riḍawī, *Aḥwāl wa-āthār-i khuwāja Naṣīr al-Dīn Ṭūsī*, 2nd printing (Tehran: Bunyād-i Farhang-i Īrān, 1354), pp. 464–7. See also Robert Wisnovsky, 'Avicenna and the Avicennan Tradition' in P. Adamson and R. Taylor (eds), *The Cambridge Companion to Arabic Philosophy* (Cambridge: Cambridge University Press, 2005), pp. 92–136, at p. 127.

104 Al-Ṭūsī, *Risāla fī ithbāt*, p. 466.

105 Al-Ṭūsī, *Risāla fī ithbāt*, p. 465.

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106 Al-Ṭūsī, *Risāla fī ithbāt*, p. 467. Al-Bayḍāwī's comment on Q. 85:22 (*Anwār al-tanzīl*, vol. 2, p. 586) held only that *al-lawḥ al-maḥfūẓ* existed above the seventh heaven. Al-Bayḍāwī, in his comments on Q. 6:59 (*Anwār al-tanzīl*, vol. 1, p. 304), explained that the *kitāb mubīn* could mean God's knowledge or *al-lawḥ al-maḥfūẓ*.

107 Al-Bayḍāwī, *Anwār al-tanzīl*, vol. 1, p. 37. Subsequently, in his comments, al-Bayḍāwī noted that rain was caused by the clouds and the skies, as well as by the orbs (*al-falak*).

108 Al-Rāzī (*Mafātīḥ al-ghayb*, vol. 2, pp. 110–1) had made similar arguments. One potential distinction between the two commentators was that al-Rāzī created the appearance of natural causes according to habit (*Mafātīḥ al-ghayb*, vol. 2, pp. 111), whereas al-Bayḍāwī left open that God actually created in the water a power (*Anwār al-tanzīl*, vol. 1, p. 37), '*bi-an ajrā ʿādatahu … aw awdaʿa fī'l-māʾ quwwa fāʿila*'. On al-Rāzī's comments, see also Dallal, 'Science and the Qur'ān', p. 549.

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